

**WHAT IS CLAIMED IS:**

1. An automatic sheet feeder, comprising:

a sheet input tray for storing a plurality of sheets including a first sheet and a second sheet, each of the sheets having a front side and a back side;

5 a first passageway, a second passageway, and a third passageway, through which the sheets may be successively fed, the first passageway communicating with the sheet input tray, a first end of the second passageway selectively communicating with the first passageway, a second end of the second passageway communicating with the first passageway, and the third passageway selectively  
10 communicating the first passageway;

a sheet-feeding mechanism having a duplex sheet-feeding mode for feeding the first sheet successively from the sheet input tray to the first passageway, the second passageway, the first passageway, and the third passageway; and

a sheet output tray, in which the sheets are stored, communicating with the  
15 third passageway, wherein in the duplex sheet-feeding mode, the front side of the first sheet is toward opposite directions when it passes through the first passageway at first and second times, and when the first sheet is fed to the third passageway, the second sheet is fed to the first passageway.

2. The automatic sheet feeder according to claim 1, wherein the first  
20 passageway comprises:

a main passageway communicating with the sheet input tray;

a first sub-passageway communicating with the main passageway and the

second passageway;

a second sub-passageway communicating with the main passageway and the third passageway; and

a main/sub-passageway guiding rod for switchably guiding the first sheet from the main passageway through the first sub-passageway or the second sub-passageway.

3. The automatic sheet feeder according to claim 2, further comprising:

a first temporary storage region selectively communicating with the first sub-passageway and the second passageway, the first sheet from the first sub-passageway being temporarily stored in the first temporary storage region; and

a first guiding rod for switchably guiding the first sheet from the first sub-passageway to the first temporary storage region, and guiding the first sheet from the first temporary storage region to the second passageway.

4. The automatic sheet feeder according to claim 3, further comprising:

a second temporary storage region selectively communicating with the second sub-passageway and the third passageway, the first sheet from the second sub-passageway being temporarily stored in the second temporary storage region; and

a second guiding rod for switchably guiding the first sheet from the second sub-passageway to the second temporary storage region, and guiding the first sheet from the second temporary storage region to the third passageway.

5. The automatic sheet feeder according to claim 4, wherein the main passageway is formed with an image processing region.

6. The automatic sheet feeder according to claim 5, further comprising a scanning module opposite to the image processing region for scanning the first sheet passing through the image processing region.

7. The automatic sheet feeder according to claim 5, further comprising a printing module opposite to the image processing region for printing the first sheet passing through the image processing region.

8. The automatic sheet feeder according to claim 5, wherein the sheet-feeding mechanism comprises:

a sheet-input roller for feeding the first sheet from the sheet input tray to the main passageway;

a first roller set located on the main passageway for assisting in feeding the first sheet from the sheet input tray to the first sub-passageway, and assisting in feeding the first sheet from the second passageway to the second sub-passageway;

a second roller set for feeding the first sheet from the first sub-passageway to the first temporary storage region, and feeding the first sheet from the first temporary storage region to the second passageway;

a third roller set for feeding the first sheet from the second sub-passageway to the second temporary storage region, and feeding the first sheet from the second temporary storage region to the third passageway; and

a sheet-output roller set for feeding the first sheet from the third passageway

to the sheet output tray.

9. The automatic sheet feeder according to claim 1, further comprising:

a temporary storage region selectively communicating with the first passageway and the second passageway, the first sheet of the first passageway  
5 being temporarily stored in the temporary storage region; and

a first guiding rod for switchably guiding the first sheet from the first passageway to the temporary storage region, and guiding the first sheet from the temporary storage region to the second passageway.

10. The automatic sheet feeder according to claim 9, further comprising:

10 a second guiding rod for switchably guiding the first sheet from the first passageway to the temporary storage region or the third passageway.

11. The automatic sheet feeder according to claim 10, wherein the first passageway is formed with an image processing region.

12. The automatic sheet feeder according to claim 10, further comprising a  
15 scanning module opposite to the image processing region for scanning the first sheet passing through the image processing region.

13. The automatic sheet feeder according to claim 10, further comprising a printing module opposite to the image processing region for printing the first sheet passing through the image processing region.

20 14. The automatic sheet feeder according to claim 10, wherein the sheet-feeding mechanism comprises:

a sheet-input roller for feeding the first sheet from the sheet input tray to the first passageway;

a first roller set and a second roller set located on the first passageway for assisting in feeding the first sheet from the sheet input tray to the temporary storage region, and assisting in feeding the first sheet from the second passageway to the third passageway;

a third roller set for feeding the first sheet from the first passageway to the temporary storage region and feeding the first sheet from the temporary storage region to the second passageway;

a fourth roller set for feeding the first sheet from the first passageway to the third passageway;

a fifth roller set located on the third passageway for assisting in feeding the first sheet from the third passageway to the sheet output tray; and

a sheet-output roller set for feeding the first sheet to the sheet output tray.

15 15. The automatic sheet feeder according to claim 14, wherein the third roller set and the fourth roller set share one roller.

16. The automatic sheet feeder according to claim 1, wherein the sheet-feeding mechanism further has a simplex sheet-feeding mode, in which the sheet-feeding mechanism feeds the first sheet from the sheet input tray through the first passageway and finally to the sheet output tray, a relative order between the first sheet and the second sheet is kept unchanged after the sheets are fed in the simplex sheet-feeding mode or the duplex sheet-feeding mode.

17. An automatic sheet feeder, comprising:

a sheet input tray for storing a plurality of sheets including a first sheet and a second sheet, each of the sheets having a front side and a back side;

a sheet output tray for storing the sheets after being fed;

5 a first passageway and a second passageway, through which the sheets may be successively fed, the first passageway communicating with the sheet input tray, a first end of the second passageway selectively communicating with the first passageway, and a second end of the second passageway communicating with the first passageway; and

10 a sheet-feeding mechanism for feeding the first sheet successively from the sheet input tray through the first passageway, the second passageway and the first passageway, and finally to the sheet output tray.

18. The automatic sheet feeder according to claim 17, wherein the first passageway comprises:

15 a main passageway communicating with the sheet input tray;

a first sub-passageway communicating with the main passageway and the second passageway;

a second sub-passageway communicating with the main passageway and the sheet output tray; and

20 a main/sub-passageway guiding rod for switchably guiding the first sheet from the main passageway through the first sub-passageway or the second sub-

passageway.

19. The automatic sheet feeder according to claim 18, further comprising:

a temporary storage region, which selectively communicates with the first sub-passageway and the second passageway, for temporarily storing the first sheet  
5 from the first sub-passageway; and

a first guiding rod for switchably guiding the first sheet from the first sub-passageway to the temporary storage region, and guiding the first sheet from the temporary storage region to the second passageway.

20. The automatic sheet feeder according to claim 19, wherein the main  
10 passageway is formed with an image processing region.

21. The automatic sheet feeder according to claim 20, further comprising a scanning module opposite to the image processing region for scanning the first sheet passing through the image processing region.

22. The automatic sheet feeder according to claim 20, further comprising a  
15 printing module opposite to the image processing region for printing the first sheet passing through the image processing region.

23. The automatic sheet feeder according to claim 20, wherein the sheet-feeding mechanism comprises:

a sheet-input roller for feeding the first sheet from the sheet input tray to the  
20 main passageway;

a first roller set located on the main passageway for assisting in feeding the

first sheet from the sheet input tray to the first sub-passageway, and assisting in feeding the first sheet from the second passageway to the second sub-passageway;

a second roller set for feeding the first sheet from the first sub-passageway to the temporary storage region, and feeding the first sheet from the temporary storage region to the second passageway; and

a sheet-output roller set for feeding the first sheet from the second sub-passageway to the sheet output tray.

24. The automatic sheet feeder according to claim 17, further comprising:

a temporary storage region, which selectively communicates with the first passageway and the second passageway, for temporarily storing the first sheet from the first passageway; and

a first guiding rod for switchably guiding the first sheet from the first passageway to the temporary storage region, and guiding the first sheet from the temporary storage region to the second passageway.

25. The automatic sheet feeder according to claim 24, further comprising:

a second guiding rod for switchably guiding the first sheet from the first passageway to the temporary storage region or the sheet output tray.

26. The automatic sheet feeder according to claim 25, wherein the first passageway is formed with an image processing region.

27. The automatic sheet feeder according to claim 25, further comprising a scanning module opposite to the image processing region for scanning the first



sheet passing through the image processing region.

28. The automatic sheet feeder according to claim 25, further comprising a printing module opposite to the image processing region for printing the first sheet passing through the image processing region.

5        29. The automatic sheet feeder according to claim 25, wherein the sheet-feeding mechanism comprises:

        a sheet-input roller for feeding the first sheet from the sheet input tray to the first passageway;

        a first roller set and a second roller set located on the first passageway for  
10        assisting in feeding the first sheet from the sheet input tray to the temporary storage region, and assisting in feeding the first sheet from the second passageway to the sheet output tray; and

        a sheet-output roller set for feeding the first sheet from the first passageway to the sheet output tray.

15        30. The automatic sheet feeder according to claim 29, wherein the second roller set and the sheet-output roller set share one roller.

31. The automatic sheet feeder according to claim 24, wherein the sheet-feeding mechanism comprises:

        a sheet-input roller for feeding the first sheet from the sheet input tray to the  
20        first passageway;

        a first roller set located on the first passageway for assisting in feeding the

first sheet from the sheet input tray to the temporary storage region, and assisting in feeding the first sheet from the second passageway to the temporary storage region; and

5 a sheet-output roller set for feeding the first sheet from the first passageway to the temporary storage region, feeding the first sheet temporarily stored in temporary storage region to the second passageway, feeding the first sheet from the second passageway and the first passageway to the temporary storage region, and then releasing the first sheet to let it fall down to the sheet output tray.